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**DETAILED DESCRIPTION**

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**[Detailed Description of the Invention]****[0001]**

[Field of the Invention]This invention relates to the information storage method and information reproduction mode which record and reproduce information to a medium.

**[0002]**

[Description of the Prior Art]The disk unit 5 which drawing 8 shows the conventional example which used the disk as the recording medium, and performs record and playback for information on the disk 6, It comprises the Records Department 3 which processes the data recorded on the disk 6, the regenerating section 4 which processes the data played from the disk, the final controlling element 1 for directing record reproduction operation, and the control section 2 which performs control of the Records Department 3, the regenerating section 4, and the disk unit 5 with the directions from the final controlling element 1.

**[0003]**

[Problem(s) to be Solved by the Invention]Conventionally [ this ], in a device, when the non-recording area of the disk 6 (disk A) is lost during record of information, there may be a case where he would like for a user to exchange for the new disk B and to continue record of information. However, in such a case, the user has to memorize one by one that information is recorded on the disk B following on the disk A. On the other hand, although it memorizes that the disk which should be exchanged is the disk B in the memory of the device main frame and a method that the disk which should be exchanged with a user by reading and displaying this is told is also considered, Now, in a memory with comparatively big capacity is needed for a device main frame and playing a disk with a different device, it also produces the problem that the disk which should be exchanged cannot be displayed.

[0004]Then, this invention makes it a technical problem to enable it to display simply the disk which should be exchanged on a user, even if it does not memorize the disk which a user

should exchange one by one.

[0005]

[Means for Solving the Problem]In view of an aforementioned problem, this invention has the following features.

[0006]An invention concerning claim 1 is the information storage method recording identification information of the medium 2 by which information is recorded next to the medium 1 by which information is recorded previously, when data of a continuous prescribed unit is recorded ranging over two or more media.

[0007]An invention concerning claim 2 records identification information of the medium 1 by which information is recorded previously in claim 1 to the medium 2 by which information is recorded later.

[0008]In claim 1 or 2, when identification information of the medium 2 concerned is memorized to a device main frame at the time of record of information over the medium 2 and then a device main frame is equipped with the medium 1, an invention concerning claim 3 reads identification information of the memorized medium 2 concerned, and records it on the medium 1.

[0009]In claim 3, an invention concerning claim 4 eliminates identification information of the medium 2 memorized to a device main frame, after recording identification information of the medium 2 on the medium 1.

[0010]In claim 2 or 3, when identification information of the medium 1 concerned is memorized to a device main frame at the time of record of information over the medium 1 and a device main frame is equipped with the medium 2, an invention concerning claim 6 reads identification information of the memorized medium 1 concerned, and records it on the medium 2.

[0011]An invention concerning claim 7 is set they to be [ any of claims 1-6 ], it has a secondary memory means to hold data inputted following while exchanging for the medium 2 from the medium 1, and data memorized by said secondary memory means at the time of record over said medium 2 is recorded on the medium concerned.

[0012]An invention concerning claim 8 record of data to the medium 2 in claim 7, Data which begins from data inputted after exchanging to the medium 2, and is memorized by said secondary memory means, After record of the data concerned inputted is completed, read from the secondary memory means concerned and it records on the medium 2 concerned, Link information which prescribes a read-out order of each data concerned that data furthermore memorized by said secondary memory means and data inputted after said exchange are located in a line on a time series is recorded on the medium 2 concerned.

[0013]An invention concerning claim 9 is an information reproduction mode which reproduces a medium recorded by any of claims 1-8 they are, reads identification information of the medium 2 at the time of reproduction of the medium 1, and displays this.

[0014]In claim 9, an invention concerning claim 10 displays identification information of the medium 2 currently recorded on the medium 2, when it has a means to detect a residue of information which should be reproduced and the residue concerned is less than a predetermined threshold at the time of reproduction of the medium 1.

[0015]

[Embodiment of the Invention]An embodiment of the invention is shown in drawing 1. In a figure, 1 is a final controlling element which consists of key switches, and sends instructions of record, reproduction, etc. to the control section 2 according to a user's operation. 2 is a control section and controls each part according to the instructions from the final controlling element 1, etc. 3 is the Records Department, carries out signal processing of the record data inputted, for example from external source, and sends it to the disk unit 5. 4 is a regenerating section, processes the regenerative data led from the disk unit 5, and sends this to the picture multiplex section 11.

[0016]According to this embodiment, the video signal of NTSC is inputted into the Records Department 3, and the Records Department 3 formats, after doing the AD translation of this, and it processes a data compression (encoding) further. On the other hand, the regenerating section 4 performs processing that this Records Department 3 is reverse, and processes and outputs the regenerative data from the disk unit 5 to the video signal of NTSC.

[0017]5 is a disk unit and writes the data from the Records Department 3 in the disk 6. Here, the disk etc. which can be added [ that rewriting of versatility, such as optical magnetism and a phase change, is possible or ] can be used for the disk 6. For example, DVD-RAM (Digital Video Disc-Random Access Memory), ASMO (Advanced Strange Magnetic Optical), etc. are used. The user can detach [ this disk unit is provided with a disk loading part, and ] and attach the disk 6 to a device main frame via this disk loading part. Attachment and detachment of this disk 6 are detected by the switching means allotted to the loading part, and the detection result is sent to the control section 2.

[0018]Since the well-known method is adopted, for example in a DVD device about the structure of the record reproduction head of the disk unit 5, tracking control, and focus control, and the roll control of a disk, the explanation is omitted here.

[0019]7 is a storage parts store constituted by RAM (Random Access Memory), for example, and memorizes data required for various kinds of control sent from the control section 2. 8 is a reserve disk unit constituted, for example with a hard disk, and stores temporarily the data it cannot be remembered at the time of disk-swapping that mentions later on the disk 6. 9 is a monitor and displays this in response to the video signal sent from the regenerating section 4. 10 is a display control part, and it outputs the video signal for the character representations "exchange for the disk B" as displayed, for example on the monitor 9 of drawing 2. This display control part builds in ROM (Read Only Memory) which memorizes the data corresponding to

the character which should be displayed. 11 is a picture multiplex section, superimposes the character representation signal from the display control part 10 on the video signal from the regenerating section 4, and sends this to a monitor.

[0020]12 is a data volume counter and counts the data volume after a recording start or a reproduction start. This counted value is sent to the control section 2, and computes the remaining file capacity at the time of reproduction (file residue), or the record possible capacity at the time of record according to the following expression in the control section 2.

[0021]file residue = -- the amount of amount record possible-capacity = disk full capacity-existing file capacity-write data of file size read data concerned -- here, "The file size concerned" means the total data volume of the file, and "disk full capacity" means the storage capacity of an entire disk when no data is memorized by the disk, "Existing file capacity" means the sum total data volume of all the files already recorded on the disk.

[0022]The file format of record data is shown in drawing 2. A management file stores the information for managing an entire disk, and holds information, including "disk identification label (Label)" etc. mentioned later besides the above-mentioned "the disk full capacity (Disc Size)" and "existing file capacity (Recorded)." Each image file (the file 1, file 2 --) is divided into the control file and the data file, among these to a control file. The link information which specifies the reproduction sequence of the picture image data in the above "file size (Size) concerned", and a data file besides "the disk-swapping information (Pre)" (Next) mentioned later is held.

[0023]Here, the information, including "disk full capacity (Disc Size)", "existing file capacity (Recorded)", "disk identification label (Label)", etc., currently recorded on the management file is read by the disk unit 5 at the time of disk wearing, and is stored in the storage parts store 7. In advance of reproduction of the file concerned, information, including the "file size concerned" etc. furthermore memorized by the control file, is read from the control file of the file concerned, and is memorized by the storage parts store 7.

[0024]The control section 7 reads the information which takes at the time of record or reproduction from the storage parts store 7, and is receiving the counted value at the time of record or reproduction from the data volume counter 12 one by one, and computes the residue at the time of record or reproduction one by one according to the above-mentioned formula. And if this residue is less than a predetermined threshold, the display command as follows will be sent to the display control part 10.

[0025]That is, if the record possible capacity of a disk is less than remaining 3 minutes at the time of record, the instructions which perform the display "disk storage capacity decreased" will be sent to the display control part 10. If the record possible capacity of a disk furthermore remains and it is less than 1 minute, the instructions which perform the display "exchange for a new disk" will be sent to the display control part 10.

[0026]If the remaining capacity of the file concerned is less than remaining 1 minute at the time of playback, when the video information of the file is recorded ranging over other disks (for example, the disk B), the instructions which perform the display "exchange for the disk B" are sent to the display control part 10. Here, detection of whether the video information of the file is recorded ranging over other disks is performed by checking the "disk-swapping information" memorized by the control file of the file concerned.

[0027]Next, the above "disk-swapping information" is explained with reference to drawing 2 and drawing 3. "Disk-swapping information" is the identification information for identifying each linked disk concerned, when predetermined video information is recorded ranging over two or more disks. For example, in drawing 2, the image file of the file N is taken over to the disk to which the identification label of "the movie B" was given besides the disk concerned. Here, Next is area which stores the identification label of the following disk with which the file concerned is succeeded. It turns out that the file which succeeds this file exists in the disk of the label of "the movie B" by "the movie B" being memorized to the field of this Next. Incidentally, Pre. is a field which the file concerned succeeds and which memorizes the identification label of a previous disk.

[0028]The more concrete example of the starting "disk-swapping information" is shown in drawing 3. The data of two files (the title XXX and the title YYY) is recorded on the disk of the label "movie A" as the graphic display. The file of the same title as the title YYY of the disk of "the movie A" is recorded on the disk of the label "movie B." And "the movie B" is recorded on the control file of the title YYY of the disk of "the movie A" as a label of the following disk. On the other hand, "the movie A" is memorized by the control file of the title YYY of the disk of "the movie B" as a label of a front disk.

[0029]If the title YYY of "the movie A" is played and the residual time of the file concerned is below 1 minute as mentioned above with the disk recording playback equipment shown in drawing 1, the control section 2 will take out the information that the following disk is "the movie B" from the storage parts store 7, and will send this to the display control part 10. In response, the display control part 10 creates the status signal "exchange for a disk "movie B""", and sends this to the picture multiplex section 11. A deer is carried out and the picture which the character "exchange for a disk "movie B"" put on the picture of the title YYY is projected on the monitor 9.

[0030]If a user exchanges for the disk of "the movie B" after an appropriate time, the control section 2 will issue the instructions which access the control file on a disk to the disk unit 5. The disk unit 5 accesses all the control files on a disk in order, and sends the information on the Pre. area of each control file to the control section 2 one by one. The control section 2 compares the identification label of this Pre. area with the identification label "movie A" of a previous disk, and when both are in agreement, it directs playback of the congruous files

concerned to the disk unit 5. A deer is carried out, the file of the title YYY of "the movie A" is succeeded, and reproduction of the file of the title YYY of "the movie B" is started.

[0031]Next, the recording operation in the above-mentioned embodiment is explained with reference to the flow chart of drawing 4. Record is started by the disk unit 5 by which recording instruction is made via the final controlling element 1 (Step 301) after being equipped with a disk (Step 302). This record is performed until the disk 6 is removed or directions of the end of record are made by the final controlling element 1 (Step 303,304). In this record, if the record possible capacity (availability) of the disk 6 is lost as mentioned above and a user exchanges the disk 6, "disk identification label (Label)" of the removed disk concerned will be memorized by the storage parts store 7 (Step 305). And the picture image data inputted following the disk extraction operation-back is stored in the reserve disk unit 9 until a new disk is inserted and it will be in a recordable state (Step 306,307,309).

[0032]If a new disk is inserted after an appropriate time, "disk identification label (Label)" of this disk will be memorized by the storage parts store 7 (Step 308), and a subsequent input video data will be recorded on the free space of the new disk concerned. Under the present circumstances, "disk identification label (Label)" of a previous disk is written in the Pre. field of the control file of the new disk concerned.

[0033]When "disk identification label (Label)" is not yet set up by an unrecorded disk at all, the new disk concerned, "Disk identification label (Label)" is set up by the user according to Steps 329-331 of drawing 5 mentioned later, and "disk identification label (Label)" of the new disk concerned is memorized by the storage parts store 7 after an appropriate time according to Step 308.

[0034]After carrying out a deer and completing record of the input video data to a new disk (Step 303) next, the picture image data held to the reserve disk unit 9 at the time of disk-swapping is recorded on the new disk concerned (Step 310,311). And the link information which specifies the reproduction sequence in the file concerned is recorded on the control file to the file concerned so that data may be located in a line on a time series on the file of the new disk concerned. That is, reproduction sequence is corrected with a pointer so that the data held at the reserve disk unit may be reproduced previously.

[0035]After the above recording operation is completed, "disk identification label (Label)" of a previous disk and the following disk is memorized for the "disk-swapping information" about the file concerned by the storage parts store 7 as a set. The contents of this storage parts store 7 are shown in drawing 5.

[0036]By the way, in the above-mentioned recording operation, although "disk identification label (Label)" of the previous disk was able to be recorded to a new disk, In order to take a link with the following disk for a previous disk and to display "disk identification label (Label)" of the following disk on a user at the time of playback, It is necessary also to the control file of the file

of a previous disk concerned to record "disk identification label (Label)" of a next disk. That is, in drawing 5, it is necessary to specifically write "the movie B" in the field (refer to drawing 2) of NEXT among the control file of the title YYY of "the movie A." The writing to this NEXT field is performed to the timing by which the disk unit 5 was equipped with the disk (it is a disk of "the movie A" in drawing 5, for example) of the point concerned for a certain purpose for playback or record.

[0037]The writing operation of "disk identification label (Label)" to this NEXT field is shown in drawing 6. If it is detected that the disk 6 was inserted to the disk unit 5 (Step 320), it is distinguished whether the identification label is already set as this inserted disk and the identification label is not set up, The input request of an identification label is displayed on the monitor 9 via the display control part 10 (Step 329). If a user inputs an identification label by the final controlling element 1 in response to this display (Step 330), this identification label will be memorized by the management file shown in drawing 2 (Step 331).

[0038]On the other hand, if the identification label is already set as the inserted disk, the identification label concerned will be read and it will be distinguished whether this label exists in the "disk identification label" of "the previous disk" shown in drawing 5 (Steps 322-324). This distinction is made by checking the contents of the storage parts store 7. And if the label concerned exists all over the table of this storage parts store 7, the "disk identification label" of the "following disk" corresponding to the label concerned will be read (Step 325). The "disk identification label" of the "following disk" concerned is memorized to a NEXT field among the control file of the applicable title of this inserted disk.

[0039]If the "disk identification label" of "the following disk" is written in as mentioned above, corresponding data will be eliminated from the storage parts store 7 (Step 327).

[0040]Next, the reproduction motion of data is explained with reference to drawing 7. First, if equipped with a disk, as mentioned above, the management file (refer to drawing 2) of the disk concerned will be read, and the storage parts store 7 will memorize. Reproduction of data is performed, after the control file corresponding to this file will be read and the storage parts store 7 will memorize (Step 342), if the reproduction starting command of the predetermined file was made by the final controlling element 1 after an appropriate time (Step 341) (Step 343).

[0041]If playback progresses and it becomes the fixed time before an end of the file concerned, it will be distinguished whether the identification label of the following disk exists in the NEXT field of the control file concerned (Step 345). When the identification label of the following disk exists, the exchange demand of the above disks is displayed on a monitor via the display control part 10 (Step 346).

[0042]If the disk concerned is played to the last after an appropriate time (Steps 347 and 348), it will wait for exchange of the following disk (Step 349). And wearing of the following disk will

perform playback of the disk concerned like the above. What is necessary is to perform indicating [ carry out unloading of the disk or / that it is a disk which is not right ] operation, and just to demand exchange of a proper disk from a user, when the new disk with which it was equipped is not a right disk which should be exchanged.

[0043]If a deer is carried out and it is exchanged for a right disk, as above-mentioned, the disk unit 5 will access the file of a continuation and will perform playback of the data to continue.

[0044]As mentioned above, although the embodiment of the invention was described, this invention is not restricted to this embodiment and it cannot be overemphasized that various change is otherwise possible. For example, although the user inputted the disk identification label from the final controlling element in the above-mentioned embodiment, When ID equivalent to an identification label is recorded on the disk from the beginning and a user can discriminate a disk from the exterior by a certain method with the ID, it may be made to use this ID instead of the above-mentioned disk identification label.

[0045]

[Effect of the Invention]As mentioned above, according to this invention, since the disk which should be exchanged can always be displayed on a user even when data is recorded ranging over two or more disks, convenience can be raised.

[0046]

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[Translation done.]